# Can Median Bike Paths Work in the United States?

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**Abstract:** If properly designed, bike paths are popular among all skill levels of bicyclists and, if located to serve major destinations, can increase the number of people bicycling for transportation. Independent rights-of-way for bike paths, such as rail or utility rights-of-way or along creeks, rivers and shorelines, are rare in many if not most urban areas, especially in locations that will attract transportation cyclists, e.g. near employment centers, schools, and shopping districts. Some communities have responded by providing "side paths" i.e. two-way bike paths adjacent and parallel to arterials, or even by building wide sidewalks and calling them bike paths; but both of these options have inherent safety conflicts that are difficult to mitigate.[1]

One author recently spent three months in Turin Italy where a variety of bikeways have been built in the last ten years; many of them are median bike paths. The second author was involved in the design and implementation of a median bike path in southern California. This paper describes and illustrates the median bike paths of Turin Italy and the recent implementation of a median bike path in Los Angeles. It examines the safety benefits that they have compared to both bike lanes and side paths. It also details important design features that if not included, would compromise the safety benefits of median bike paths. The paper concludes with points to consider in their planning and design.

## Definitions

The California *Highway Design Manual (*HDM) defines a bike path as follows:

*Class I Bikeway (Bike Path). Provides a completely separated right-of-way for the exclusive use of bicycles and pedestrians with crossflow minimized. (HDM)*

American Association of State Highway Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities* (Bike Guide) defines a bike path as follows:

*BIKE PATH - see Shared Use Path*
*SHARED USE PATH—A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. (AASHTO 1999)*

## Introduction

Since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, there has been a dramatic increase in the construction of new bike paths and bike lanes. While there are very real differences in the types of bicyclists that use the

[1] AASHTO) *Guide for the Development of Bicycle Facilities* (Bike Guide), 1999

various bikeway facilities, it is generally true that when bike paths and bike lanes are built, more people tend to choose to bicycle as their mode of transportation. Bike paths in particular can serve a valuable role in a bikeway network[i], but it is often difficult to find adequate right-of-way in a built-out metropolitan area. Typical locations with sufficient right-of-way to properly build a bike path are along waterways such as creeks, lakes and shorelines and on railroad rights-of-way, abandoned or live. Flood control levees, designed for the 100-year flood, have become increasingly popular opportunities for bike paths in California in the past twenty years.

Although these types of alignments were present in many communities, many others did not have these opportunities, or if they did have some, cities wanted to provide even more mileage of bike path in their networks. This situation led many cities to build "side paths" adjacent to roadways. The HDM and AASHTO Bike Guide do not recommend side paths, as they present the same conflicts and problems as does bicycling on sidewalks. This paper will discuss a third alternative - the median bike path.

## Turin and Median Bike Paths

In the 1990's when Turin Italy began planning a citywide bikeway network, it found itself with many opportunities even though it is a centuries-old built-out city. Most of its arterials had either a wide center median, which divided the two opposing directions of traffic, or two side medians which separated the main road from a local frontage road on each side. (Typically a frontage road is one-way.)

Figure 1 Unimproved center median with dirt surface.

Some roads have three medians- two side and one center. Many medians had been used as informal walking paths and others were (and still are) used for public parking. The City turned many of these medians into bike paths.

Figure 2 - Center median with traditional pavement surface.

## Center Median Path

The typical center median on an arterial in Turin is about 40 feet wide with two rows of trees. Occasional benches and water fountains are provided, and many roads permit parking adjacent to the median as shown in the photo. Redesigning these as bike paths was relatively straightforward, this part of the City is flat, so the median had no stairs or slope issues. There were median breaks only at major cross streets. At these locations, the intersections were controlled by traffic signals.

**Figure 3 Typical Turin road with a center median; note that it enables four lanes of on street parking.**

**Figure 4 Median bike path with "sidewalk" for pedestrians.**

**Side median path.** Some roadways are designed as an undivided four or six lane roadway with a “frontage” road on both sides; a “median” separates the main road from the one-way frontage roads. These side medians are typically tree-lined with a walkway and the frontage road typically has on street parking on both sides. In side medians of sufficient width, a bike path was built in many locations. Some side medians are immediately adjacent to a tram lane. As shown in Figure 6, in these cases, the median serves to separate the light rail trains from the frontage road and also to provide the needed boarding platforms.

Figure 5. Side median bike path with two rows of trees

Figure 6 Side median adjacent to tram lane.

The concern regarding the bike path intersection with the cross streets is an issue for all bike paths, whether on an independent right-of-way, a side path or a median bike path. Intersections with median bike paths can be relatively easily mitigated compared to side paths, as discussed later in this paper

## Benefits of Median Bike paths

If properly designed, bike paths are popular among most skill levels of bicyclists and demographic groups, especially those who are not comfortable riding in traffic. This includes families with children, teenagers, novice bicyclists (adults who have not ridden much since their childhood) and the elderly. Clearly median bike paths, almost by definition, serve major destinations, since arterials in general, also serve said destinations. Therefore, a presence of a median bike path on an arterial makes all the destinations along that arterial more accessible by bicycle to a greater proportion of the population than bike lanes alone. Even skilled cyclists will ride on bike paths, depending on the available alternatives and on the speed they can attain.

In addition to encouraging more people to bicycle, there are very real traffic safety benefits that median bike paths have compared to bike lanes and side paths:

1) On a median bike path, there is no risk of the right-hook collision, whereby a right-turning motorist passes the bicyclist on the left and then turns right, in front of the bicyclist. This is a serious problem with side paths as well as road riding.

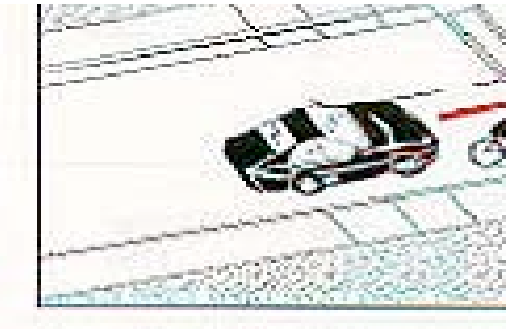

Figure 7- Right- hook collision threat.

2) Intersections with local streets and driveways do not present conflicts to bicyclists riding in the median. This is not the case with riding on the roadway with or without bike lanes or with side paths. Only in the median is the cyclist removed from the right turns in and right turns out into local streets as well as driveways.

3) Bicyclists on a median bike path are not riding adjacent to parked cars and thus there is no possibility of being doored – i.e. the driver in a parked car opens the door without looking for oncoming cyclists.

4) Bicyclists on a median bike path are not riding in or adjacent to the curb lane with busses, thus there are no busses to "play leap frog" with. Madison WI solved this problem by positioning an eight-foot wide bike lane to the left of the bus only lane, but not all cities are willing or able to do this.

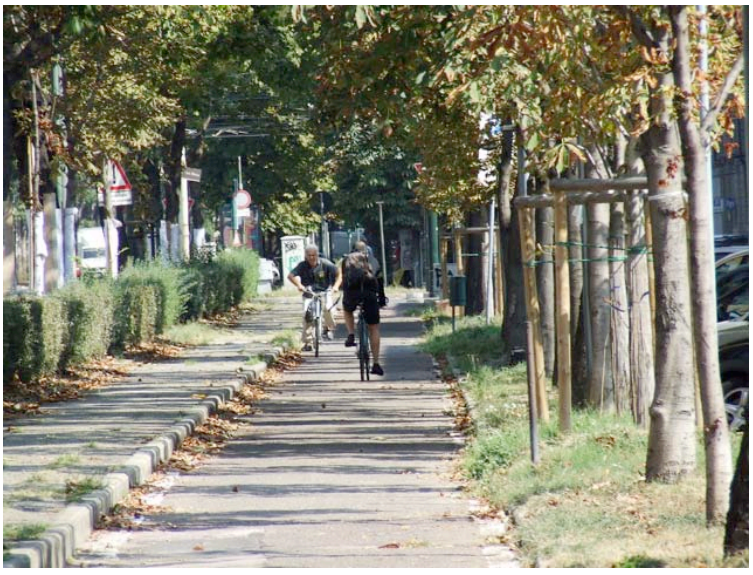

Figure 8 Median bike path well insulated from traffic by trees and landscaping.

In general median bike paths can be a very pleasant place to ride in the middle of a congested city. As Figure 8 shows, they can be very wide, nicely landscaped, tree-lined and quite serene.

## Potential Issues /Problems

There are a few concerns, and as with all bike paths, they relate to intersections. The HDM Chapter 1003.1 (6) lists the concerns as follows:

*"Bike Paths in the Median of Highways. As a general rule, bike paths in the median of highways are not recommended because they require movements contrary to normal rules of the road. Specific problems with such facilities include*:

*(a) Bicyclist right turns from the center of roadways are unnatural for bicyclists and confusing to motorists.*

This concern can be overcome through the use of good design and proper signalization that controls the movements of bicyclists and motorists. Clearly, bicyclist "right-turns " should not be permitted from the median; instead the bicyclist leaving the median will essentially act as the cross traffic does, but the cyclist need only cross one lane of traffic. Sight lines should be developed or increased to ensure that all users of the roadway have good visual access to each other. Ideally all intersections would be signalized to further assign right of way to the parties.

*(b) Proper bicyclist movements through intersections with signals are unclear.*

This is a obsolete argument due to advances in signal phasing and particularly now with the permitted bicycle signal head described below.

*(c) Left-turning motorists must cross one direction of motor vehicle traffic and two directions of bicycle traffic, which increases conflicts.*

Advances in signal phasing and detection technology as well as the now-permitted bicycle signal head in California can clearly assign right of way to the appropriate movements. When the bicyclist receive a green "Bicycle" symbol, as shown in Figure 9, the motorist left-turn movement has a red arrow, conversely when the left turn movement has a green arrow, the bicycle signal head is red.

**Figure 9 Bicycle signal head assigns ROW to through bicycles while left turning drivers face a red arrow.**

*(d) Where intersections are infrequent, bicyclists will enter or exit bike paths at midblock.*

In a typical urban area, which is the topic of this paper, this is not an issue. If median bike paths were to be considered in other areas, then considerations should be given to the potential demand for midblock access. If a concern, design strategies can be employed to discourage such movements such as appropriate landscaping or fences.

*(e) Where medians are landscaped, visual relationships between bicyclists and motorists at intersections are impaired.*

Clearly, if a median is to have a bike path, the landscaping would need to be designed to be compatible with that use. Again, good sight lines are a must.

HDM 1003.1(6) concludes*: For the above reasons, bike paths in the median of highways should be considered only when the above problems can be avoided.* ***Bike paths shall not be designed in the medians of freeways or expressways.***

This paper will now present the California case study where the implementation of a median bike path in Los Angeles was able to avoid these problems.

**American Case Study: Culver Boulevard Median Bike Path**

In the early 1990's, the City of Los Angeles began development of the Culver Boulevard Bicycle Path. The project primarily grew out of the need to improve an abandoned rail right-of-way that had become a dumping ground and public eyesore. While not as old as Turin, the lack of new opportunities for bikeways in Los Angeles also made this large right-of-way attractive to consider for a bikeway opportunity. Evaluated for its potential as a segment of the light rail network being developed throughout the County, the right-of-way was rejected due to a lack of linear connectivity with the other segments.

The 60-foot wide median, approximately 4.5 miles long, is now owned by the Cities of Culver City and Los Angeles, and the Los Angeles County Metropolitan Transportation Authority (LAMTA). The median is located between Culver Boulevard, an arterial roadway, and "Little" Culver Boulevard, a low volume, low speed residential street serving single-family homes and apartment buildings. On street parking is permitted on "Little" Culver Boulevard. The east end connects to the segment in Culver City and the west end of the project is linked to the City of Los Angeles' Ballona Creek Bicycle Path which leads to the Beach Bicycle Path by a quarter-mile Class III Bicycle Route on a low volume, low speed street.

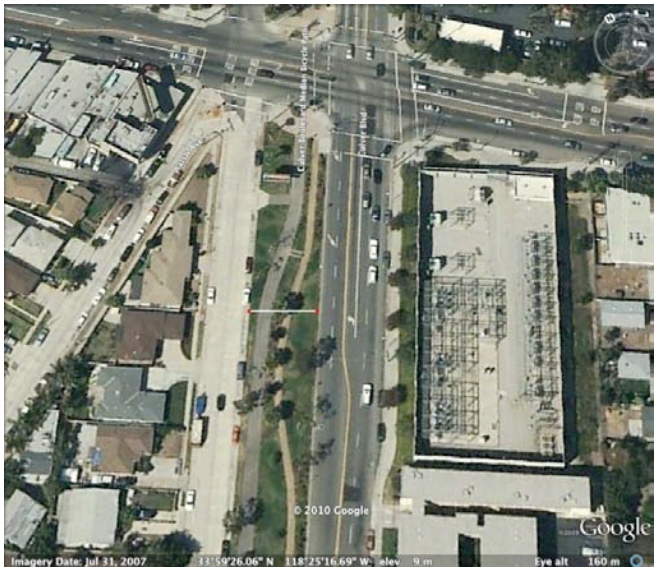


**Figure 10 Aerial view of Culver Blvd and the median bike path.**

The City of Culver City began the project within their jurisdiction by creating a linear park with a meandering asphalt bicycle path located in the median right-of-way surrounded by extensive landscaping. At each intersection, bicyclists are required to cross intersections by negotiating three legs of the intersection on three separate signal phases activated by pedestrian pushbuttons. The project within the City of Los Angeles

was addressed somewhat differently. While politically motivated in that staff was mandated by elected officials to apply for funding and design a bicycle path in the median, Department of Transportation Bikeways staff choose to develop the facility with transportation bicycling as the key factor in the design of the bicycle path. This led to different design decisions regarding both the “plan view” and at intersections.

The primary design concerns were how to create a bicycle path that would safely encourage bicycle transportation use and how to create a facility that would be relatively easy and low-cost to maintain. Preliminary design on the project included the development of a linear asphalt bicycle and a separate pedestrian path in a landscaped median. Landscape features were kept to a minimum especially at intersections to maintain sight lines and the facility was seeded with grass for a softer look and ease of weed control. It was clear from the outset that crossings at intersections were crucial to address in a manner that promoted rather than discouraged bicycle use.

**Figure 11 Culver Blvd bike path and adjacent pedestrian path**

The project was presented to the public at design workshops which provided the community and local residents an opportunity for input. At each of the meetings differing opinions were expressed by the public on the various design options and at the last meeting a strong argument was made to duplicate the efforts of Culver City by developing a curvilinear alignment for the bicycle and pedestrian paths and building the facility in decomposed granite (DG). It was determined by staff that the development of the facility in a curvilinear alignment would discourage transportation use and the California Highway Design Manual requires that bicycle paths in California have a paved surface. A compromise was reached with the public to provide a separate pedestrian path with a decomposed granite surface and with a curvilinear alignment.

The bicycle path design was for a straight linear alignment, separated from the DG path by a strip of grass so the DG would not bleed onto the asphalt surface of the bikeway. Intersection design features included the development of a crescent or half moon of colored concrete at the ends of the medians before the intersection that allowed pedestrians, bicyclists, and motorists clear visual access to each other so that all users of the roadway and paths could anticipate

**Figure 12 Culver Blvd bike path at a signalized intersection.**

each others' movements at the signal-controlled intersections. Crossings at intersections were facilitated by installing crosswalks with push button activated signalization between the median segments between Culver and Little Culver Boulevards.

## Evaluation

To-date the path has proven successful in serving residents who live either along the Culver Boulevard Corridor or in the neighboring communities north and south of the project. Due to the lack of local park space, the median bike path has also become a recreational resource for the local residents for walking and biking.

There were concerns that bicyclists would violate the traffic signal indications. In order to determine if the signals were effective, a video camera was installed and crossing movements were recorded for approximately one week, During this period it was observed that over 95 percent of bicyclists observed the traffic signal to cross the intersections. It should be noted that it was also observed that few bicyclists choose to dismount their bicycles, In addition, a new traffic signal was installed at the intersection with McConnell Avenue to facilitate continuing onto the Bicycle Route on McConnell Avenue which connects to the Ballona Creek Bicycle Path.

In addition another observed behavior is worth noting: pedestrians appear to prefer the straight, paved bicycle path rather than the curvilinear, DG pedestrian path even though the latter was requested in the public outreach process. While no formal study has been conducted, anecdotal evidence seems to suggest that pedestrians are using the path for transportation rather than recreation use and the linear, paved path appears to better suit their needs for more direct access and ease of use for strollers and other wheeled devices used on their trip.

The asphalt surface, while initially chosen for its cost effectiveness over concrete, has shown several positive qualities as a bicycle path surface. It is very easily and quickly repaired if damaged, rarely cracks in the moderate southern California climate, is a smoother riding surface for bicyclists as expansion joints are not needed and provides a softer surface for joggers and pedestrians.

## Conclusion

While median bike paths are not likely to be a big component of a typical American city's bikeway network, they can be one element of a multifaceted system of bicycle transportation. Twenty-first century bicycle planners must take advantage of rights-of-way where they are available; if wide medians are present, we submit that they have been shown to be not only compatible with bicycle transportation but popular with bicyclists as well.

To be effective, a median bike path should have the following features:

- Wide median- 25 ft minimum to 60+ ft
- If on an arterial, all cross streets must be signal-controlled

- If on an arterial, local cross streets should not have a median break, they should be right turns only.
- At signalized intersections, there should be separate signal phases for the through bike movement on the median and the left-turning motor vehicles from the travel lanes.
- If on a lower volume street, minor arterial or collector, some cross streets can remain unsignalized.
- Further research is needed to determine the ADT thresholds of the arterial vs. minor arterial/ collector street

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Ms. DeRobertis was a German Marshall Fund fellow in the fall of 2009 in Italy and Germany studying land use, transportation and parking policies. However it was impossible to ignore both the bicycle and transit infrastructure, even in the "car" towns of Turin, Italy and Stuttgart, Germany.

She currently is the Bicycle Program Manager for the VTA where she works on all things bicycle including programming and working with the 15 cities in the county. She also works on other issues such as bicycle access to transit and bike share. She was the lead author of VTA's Bicycle Technical Guidelines. She is a registered Civil and Traffic Engineer in California.

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Ms. Mowery is a bicycle transportation planner working with the city's engineering staff on the development, design, and implementation of bikeways in Los Angeles. She is responsible for the City's bicycle legislation, parking, maps, web page and other related programs. She is working on the completion of the City's Bicycle Plan and worked with LADOT Transit and Metro to install bicycle racks on agencies' buses.

A Board Member of the California Bicycle Coalition for over 10 years, and former United States Cycling Federation licensed bicycle racer, Michelle learned to ride at age four in the Los Angeles area and her first bike was a purple Schwinn Stingray.

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[i] Wolfgang Homburger et al, Fundamentals of Traffic Engineering, 16th Edition, 2007 pp 21-21.